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**21st Year of Publication**

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*Q&A With D. Allan Bromley*

## Bush's Science Chief on Prospects, Policies for '91

*SGR starts its 21st year of publication with a wide-ranging interview with D. Allan Bromley, Assistant to the President for Science and Technology and Director of the White House Office of Science and Technology Policy (OSTP). He spoke to SGR Editor Greenberg on January 8, with no topics barred except specifics of the fiscal 1992 budget, scheduled for release February 4. Following is the text, transcribed and edited by SGR.*

*SGR. You've often spoken of the importance of scientific priorities—that we can't afford everything and therefore must pick and choose, especially to protect "little science." But it's increasingly said that the Bush Administration has no science policy or priorities.*

***Bromley.*** The budget is the end product of a whole cascade of priority decisions. These are ones we're going to fund. The ones we're not going to fund you don't hear about. So, that's a priority-setting process in itself. Beyond that, the budget agreement [adopted by Congress last year] essentially sets a constant-dollar cap on domestic discretionary spending for the next several years. That's going to force the Congress to make some very substantial priority decisions.

*SGR. Are you saying that the Congress will make the priority decisions?*

***Bromley.*** No, I'm saying that we've already made a lot of them in the budget. Then we propose to the Congress, which appropriates, and the extent to which they go along with what we propose is one thing. In the past, there have been times when they haven't done that.

*SGR. Every mega-project that you inherited from the Reagan Administration remains intact.*

***Bromley.*** First of all, when the SSC [Superconducting Super Collider] was approved by President Reagan and reapproved by President Bush, there were two provisos. The first was that one-third of the total cost must come from non-federal sources and the project cannot go forward if it involves cutting into the base program [of basic scientific research supported by the Department of Energy]. Now, you look at those provisos in the light of our new budget agreement and you see very obvious difficulties.

*SGR. Are you suggesting that the SSC is not going to go forward?*

***Bromley.*** No, I'm not suggesting that. I'm just suggesting that it's going to be extraordinarily difficult to move forward with the SSC under a constant-dollar cap without cutting into the underlying program. So, that's a decision that's yet to be made.

*SGR. If one third has to come from non-federal sources, and so far there is no significant foreign participation, how can it go forward?*

***Bromley.*** We've come to a real decision point, both with respect to foreign funding—we must either get foreign funding or change the proviso. And similarly, we have to examine to what extent it will require cutting into the base

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## In Brief

**David Kessler, the physician-lawyer newly installed as Commissioner of the Food and Drug Administration, has initiated monthly meetings with the nation's arch-critic of the pharmaceutical industry, Sidney Wolfe, MD, head of the Nader-affiliated Health Research Group. The first meeting, in December, was just one-on-one, for over two hours in Kessler's office. At Kessler's suggestion, the meeting sites will alternate, with the next one in Wolfe's office. Wolfe, who has brought numerous law suits against FDA alleging default on statutory responsibilities, was essentially *persona non grata* at FDA prior to Kessler's arrival.**

*The British weekly* Nature *and its American counterpart,* Science, *journal of the American Association for the Advancement of Science, have found fruitful hunting grounds for recruiting staff—each other. Barbara J. Culliton, staff writer and former News Editor of* Science, *has just been hired by* Nature *for the newly created Washington position of Deputy Editor. Her assignment is to hustle papers from leading American researchers. Meanwhile, Alun Anderson, a British journalist who resigned last year as* Nature's *Washington editor, has been appointed to head the* Science *European news operation, based in London. Replacing him at* Nature's *Washington office will be Robert Pool, a staff writer for* Science.

**Where's the "Baltimore Case," NIH's years'-long investigation into allegations of misconduct in a 1986 *Cell* paper co-authored by Nobelist David Baltimore? A final report is still crawling through the NIH investigative system. Last spring, SGR was told it would be out in "a few weeks." In December, "early January" was the due date. The word now is "late January." The main focus of the inquiry is Thereza Imanishi-Kari, formerly of MIT, now at Tufts University. The word around NIH is that the report comes down hard on her; also, that after the report is made public, NIH plans to investigate the MIT and Tufts inquiries that reported nothing amiss.**

# . . . Still Has Hope That Japan Will Contribute to SSC

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program if we move forward. And that decision is one that Congress also will be involved in making.

***SGR.*** *After years of unsuccessful solicitations, is there still an expectation of substantial foreign support for the SSC?*

***Bromley.*** DOE still anticipates very substantial support from Japan. The Japanese have not said they would not provide that support. They simply said that they wanted more concrete evidence that we were moving forward aggressively. I don't expect substantial support from Europe, because I have every expectation that Carlo Rubbia [Director of CERN] is going do everything he possibly can to get himself the Large Hadron Collider, and that will probably take care of potential European contributions. What the Soviets do is an open question, given the state of their economy. Some other countries will give small contributions. India has been committed for a long time, and I think we can look forward to support from places like Brazil.

***SGR.*** *Senator Gore [D-Tenn.) and others complain that the Administration sticks to the SSC and other big projects, but refuses to say how we'll pay for them.*

***Bromley.*** There are a number of things that a lot of people would like to do that are not going to be in the next budget.

## *Top 20 Science Projects*

***SGR.*** *Congress has asked you to identify the "top 20 civilian science projects in the federal budget."*

***Bromley.*** That's fundamentally impossible, because there is no way you can put all the kinds of activities that the federal government supports in a one-dimensional array with a value relative to one another. So, we will point that out and develop a list, and it will be sent forward in response to that request.

***SGR.*** *It sounds as though you're not going to be directly responsive to the Congressional request.*

***Bromley.*** We can't be directly responsive, because frankly there is no way. It would be grossly unresponsive to pretend that we could put these in a linear array, and we will explain that.

***SGR.*** *The scientific community is resounding with great bitterness about the adequacy of federal support.*

***Bromley.*** There are several reasons for that. In response to requests from the individual investigators, both NSF and NIH recognized that the size of the individual grants had to be increased because it was costing more to work on the frontiers. Secondly, the argument had been made that good scientists were spending so much of their time writing proposals and reports that they should expand the duration of the grants. That they did. What that did, of course, was to establish an out-year mortgage, which each year made it more difficult to pick up the new folks that are coming in. And the rate at which they're coming in is increasing much more rapidly than the total funding could ever increase. So, we have a problem of the crunch from an almost exponentially growing demand, and because a lot of these people are very bright, they don't send in just one request, they send in a number of requests.

I checked recently to see about the people who are successful at NSF. My first assumption was that they would come out with a 100 percent success rate. It turns out that's wrong. They have a success rate just slightly over 150 percent. How can that be? The fact is that on the average, they have 1.9 proposals. They're getting multiple grants. In the biomedical area, in the last four years, let's say, the number of proposals that have been judged excellent has gone up from something less than 70 percent to something over 95 percent.

Now, I'm prepared to agree that the science has improved and that perhaps some of this reflects proposals that are resubmitted, very good ones that haven't been funded. But I also believe that the study groups are attempting to lend a hand to their young colleagues who they feel may need one. And so you're getting some grade inflation in the system. I don't like the idea of this success rate as a true measure of what's going on, because the total funding for the individual investigator has been going up at a healthy rate. It's just not going up fast enough to handle the increased number of requests, the increased magnitude of the requests, and the increase of out-year mortgages.

We under-invest in research and development. I think there's agreement on that in the Administration, in OMB [Office of Management and Budget], on the Hill. So, we have to make the most compelling argument we can that within this zero-sum game, we have to get more funding channeled into research and development, and particularly into the support of individual investigators.

***SGR.*** *Congressman Traxler and Senator Mikulski [Chairs, respectively, House and Senate Appropriations Subcommittee for NSF, along with NASA and the Departments of*

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# . . . There's "No Divine Right" to a Research Grant

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*Housing and Urban Development and Veterans Affairs] would ask, "At the cost of housing for the homeless or care for veterans?"*

***Bromley.*** It's one of the peculiarities of our system that Barbara Mikulski and her colleagues each year look at Veterans Affairs, which is the past; Housing and Urban Development, that's the present—the homeless out there, you've got to do something. And NSF and NASA, the future. And there's an understandable tendency to say, "Well, maybe the future can wait a little bit." It's an unfortunate thing that everyone recognizes. In fact, we had a meeting about eight months ago here in the White House, with the President and a lot of these people from the House and the Senate. The issue was raised that somehow we've got to come up with a more rational distribution of the responsibilities of our Congressional Committees, so that research, for example, would be measured against research. But everyone recognizes that's not going to happen overnight, that there's a tremendous amount of pressure not to change things. But there's a recognition that it would be in the best interest of everybody to do it.

***SGR.*** *When this mortgage was being acquired, wasn't there an awareness that this problem would inevitably result from it?*

***Bromley.*** Look, in 1962, studies warned that we're not going to have enough trained scientists and engineers to meet the military and space demands of the nation in the 1960s. And so, for a period of about seven years, we grew at about 20 percent a year. You would have thought that the nation's brightest folks would have been able to realize that couldn't continue indefinitely. But yet, the universities all were surprised in 1968 when that stopped, because by any measure, the crash program had succeeded. It had reached its goals, in terms of personnel and so on. But the universities had bought buildings, had given people tenure, and they were stuck with it. Shouldn't we have known? Of course. There were a lot of people who knew. But it's a problem each year, where the individual investigator says, "I want the following support to do what I'm doing today." He's not going to worry about what we have to worry about, namely, how do we invest in the facilities that are going to take this same investigator to the frontiers that he wants to be at five or ten years from now? We have to make that balance, and it's not a popular one.

There's no question—there are good proposals out there that are not being funded. Under those circumstances, there's real pain. I appreciate that there's real pain. But I keep telling people that the fact of the matter is that there's no way we're ever going to be able to remove all the pain. We're never going to be able to provide that amount of funding, because as the funding is provided, each faculty member expands his operation and produces more graduate students, and those graduate students want support. The system of funding can't grow that fast.

***SGR.*** *Mrs. Thatcher in her day dealt with that problem by concentrating the available funds in a few universities or departments and letting the others do as best as they could.*

***Bromley.*** I frankly think that Mrs. Thatcher made a fundamental mistake, because Britain, for generations, really led the world in terms of innovation, in terms of leveraging the brain power in those universities. I don't think that's true anymore. The morale has decreased badly. Britain is the happy hunting ground if you want to go hire new faculty members for the rest of the world. And, in the long run, I think that decision cost Britain dearly. I would be totally opposed to any such approach here. But the fact does still remain that just because an individual somewhere says, "I am now a chemist," that does not, a priori, convey a divine right to federal funding.

## *Expectations of Support*

***SGR.*** *There is a sense of entitlement among some scientists.*

***Bromley.*** Precisely. On the one hand, people become accustomed to a situation and through a period since about 1958 or '59, most good ideas in this country have eventually succeeded in finding support. And so, it becomes easy to understand that this is the natural order of things. That impression is not a viable one anymore.

I'm trying to develop a more stable constituency, involving not only the academics but also the private sector; the military is another group. We're the only developed country where the assumption has always been made that when the private sector or the military wanted trained personnel, they simply reached out and the public system provided it in adequate number and quality.

Other countries never assumed that. In industry, they assumed that they'd have to take the kids out of maybe high school or junior college and then spend a lot of money and time and effort training them. Having done that, they felt a real investment, and therefore it was worth their while to keep those people during downturns and try and retrain them and utilize and expand their skills. And I suspect we're going to move rather quickly in those directions.

***SGR.*** *To an apprentice system?*

***Bromley.*** Not to an apprentice system as such, but to a system where the private sector and the military are both going to have to financially support more of the education of the people that they are eventually going to need and employ.

***SGR.*** *Do you see the Defense Department playing a bigger role in university education?*

***Bromley.*** I see the technology that they have developed playing a much bigger role in education generally. I would like to see the Defense Department playing more of a role

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# . . . Urges Scientists to Go Political in Quest for Funds

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than they do now, more like they did in the '50s. The people who are charged with defending our nation should not feel alienated from the young people in our educational institutions. In the old days, the Defense Department knew on sort of an intimate basis the brightest people and there was no animosity with respect to that relation or with the graduate students. And that's healthy.

***SGR.*** *The universities are receptive to support from the Defense Department, but as [former NSF Director] Erich Bloch has said, DoD wants "a free ride" on civilian science and education.*

***Bromley.*** I think that's changing.

***SGR.*** *It doesn't show up in the budget.*

***Bromley.*** You haven't seen the new budget yet. The past budget was the first one that this Administration put out, and I think there are major changes taking place over in the Defense Department. I've had discussions with Mr. Cheney [Secretary of Defense], with Mr. Atwood [DoD Deputy Secretary], and Mr. Herzfeld [Director, Defense Research and Engineering]. The approach they have is one that I find attractive and they recognize that both they and the universities would benefit from closer collaboration.

## *NSF Budget Goals*

***SGR.*** *The goal of a doubling of the NSF budget in five years keeps slipping.*

***Bromley.*** Each year, the President does in fact propose that we keep on this doubling trajectory. We almost made it this year. It was at the last moment, within the context of the budget agreement, that we dropped off that trajectory. But there is no question whatever that as far as the Administration is concerned, we see that as an absolutely realistic and important goal for us.

***SGR.*** *The Administration says the right things, but doesn't put any political push into it.*

***Bromley.*** I've talked to Senator Mikulski and Senator Garn [Chairman and ranking Republican, respectively, on the NSF Appropriations Subcommittee] about this. The question is whether we can arrange for them to get floods of phone calls from the country on some of these issues. To be fair about it, we really give more support to science and technology and to the R&D budget than a vast number of other components of the budget. But I would agree that there are more things that we could do to support our proposals, though I think we're doing remarkably well. Where the gap is at the moment is not here at this end of the Mall. The gap is in the scientific and technological communities themselves, because there's still, unhappily, a bit of a feeling on the part of my old colleagues that there's something not entirely nice in getting involved in real political activities. They feel that those of us here in Washington will recognize that what they're doing is so important that we'll come up with the funding. It did work that way for a good many years, but it's not going to work anymore.

***SGR.*** *Do you think the defeat in the last election of [Rep.] Doug Walgren [D-Pa.], who was one of the strongest supporters science could ever hope for, is a manifestation of this scientific indifference to politics?*

***Bromley.*** It's clear, in a way, that is the case. There was no great surge of activity on the part of the academics in Doug's constituency to rally around and do something. You saw the same thing a number of years ago when [Rep.] George Brown [D-Calif.] asked the university community in California to lend him a hand, and they didn't do that much. The farmers did, and George [stepped down from the Chairmanship of a Science and Technology subcommittee] and went to [a Chairmanship on] the Agricultural Committee. That is one of the areas where our community has not really recognized the reality of the political world in which we function.

***SGR.*** *Does this point to the importance of developing scientific political action committees?*

***Bromley.*** I don't think PACs are really necessary, because, first of all, everybody recognizes that most of the academics are in no position to do anything very dramatic. Though, every little bit helps; that's true. But what I think is much more important is simply to get out and help do some campaigning and doorbell ringing. Just simply indicate that you recognize that a certain candidate has been supportive, is interested in what you're interested in. We have to become much more involved in the political process than we have been.

## *Social Sciences*

***SGR.*** *The social and behavioral sciences are campaigning for their own directorate at NSF. Is this of interest to you and your office?*

***Bromley.*** I'm in the process of fulfilling a promise I made when I came here that I'm going to appoint an Assistant Director [of OSTP] for the social sciences. In that sense, I certainly have interest in federal funding for activities in the social sciences. I have long felt that they have a lot to contribute that doesn't get into our processes here, because they are so heterogeneous and it's very difficult to get something that you can get your hands on that is by somebody's definition "social science." It sort of fragments in all directions. And I understand that. The physical sciences have been at it much longer; so have the life sciences. Whether it's the right thing to develop new structures within NSF is something I would be happy to discuss.

***SGR.*** *The social sciences want their own directorate at NSF because they think that will get them more money. Does that concern you?*

***Bromley.*** No, it doesn't concern me. It's a perfectly

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# . . . Faults US for Shifts in International R&D Projects

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natural reaction on their part. I think the question I would want answered is whether the perception that they are being treated less well because they don't have the formal structure is a true one or not.

***SGR.*** *You've said the US must learn to be a more reliable partner in international research activities.*

***Bromley.*** I would stand by those statements. We have not done too well in the past. But I think we're about to change.

***SGR.*** *We've had a number of episodes that have seriously annoyed our foreign friends.*

***Bromley.*** There are two kinds. The first is perhaps one that we will never completely remove. That's simply a misunderstanding about budgetary processes. Most of our collaborating countries, when they approve a project, they approve all the funding required for the full lifecycle. And they don't understand what we're up to when we go back the next year and go through the Congressional hearings, because from their point of view, this was already decided last year. The other problem is that we have been less than sensitive to their perfectly reasonable requirements. And we have tended in a great many cases to make decisions, make changes, and then tell our collaborators after the fact that we've done them. The space station, in particular, is a good example of that. We're learning. We're not going to do that sort of thing anymore.

With respect to the funding question, I'm convinced that we've reached the stage that any big project from here on in is going to require international discussion about what do we need in this field of science before we really get into it at all. And then, where should we put it, how are we going to fund the thing?

We're not quite ready to recommend this yet, because we haven't worked through all the nuances. But I suspect what we're going to end up with is a requirement for something much more like a treaty obligation that binds our government in much the same way that our collaborators are bound for the total duration of the project. It's going to be extremely difficult. People have an aversion to treaties, because no Congressman likes to be bound by his predecessors.

## *Space Station Downscaling*

***SGR.*** *The downscaling of the space station is a sore point with our foreign partners.*

***Bromley.*** We have had close discussions with our collaborators in Europe, Canada, and Japan. Part of the requirements in the reconfiguring and redesign of the space station is that the commitments we made back in day one are going to be maintained, so that what they have invested thus far is not in any way going to be wasted. In terms of the capability—the power, the space, and so on—it will be what they expected. The hardware they're constructing will fit and will remain viable. That has been an important boundary condition in all of this.

***SGR.*** *Congress put a curse on the competitive grants program at the Department of Agriculture by setting a 14 percent maximum for overhead costs.*

***Bromley.*** Overhead is one of those things that is not understood either very well in universities or necessarily here in Washington. It's about time we had a real careful look at A-21 [the Office of Management and Budget circular governing reimbursement of overhead, or indirect, costs on federal research grants]. The universities are becoming very much polarized. Stanford is a particularly outstanding case of this, but it's in no sense unique. What's happening is that the discussions on overhead are pitting faculty against administrations, and that's not helping anybody.

***SGR.*** *What revisions would you seek in A-21?*

***Bromley.*** There are a number of things in A-21 that make it such that if you and your university can hire a group of lawyers that are smarter than someone else's, you can improve your position. A lot of it is outdated. The depreciation schedules of 50 years for buildings and 15 years for equipment no longer really apply to any modern research activity. [Hewlett-Packard Chairman] Dave Packard and I back in '86 recommended [in a study for OSTP] that one could eliminate a tremendous amount of friction and waste effort by simply agreeing on some kind of average overhead and eliminating all the paperwork that goes with it. A new look at indirect costs is not really in the works yet, but it's the sort of thing that's being discussed with Bob Rosenzweig [President of the Association of American Universities] and OMB. It's just a growing recognition on everyone's part that the situation is going to get more counterproductive.

***SGR.*** *The President says we'll be tops in science education by the end of the decade. How is that going to happen?*

***Bromley.*** We're making some very real progress. This is the first time that anyone has begun to understand what the federal government is doing in education. That was the first task that we assigned to this committee that operates under FCCSET [Federal Coordinating Council for Science, Engineering, and Technology] that [Secretary of Energy] Jim Watkins chairs.

***SGR.*** *There was no existing inventory of federal education activities?*

***Bromley.*** No. There was no inventory. And, in fact, in almost every case, the people involved in different agencies not only had never met one another but had no interaction or coordination whatever. We first of all have done that inventory and in the report that will be released to accompany the budget, we have, I think for the first time, begun to come to grips with what really is going to be required to allow us to have a hope of meeting the goals that were established by the President and the Governors with respect to education. The

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# . . . Education Reform to Focus on Teaching Ability

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goal is that by the year 2000, American kids will be second to none in science and mathematics.

***SGR.*** *No one takes that goal seriously.*

***Bromley.*** We take it seriously.

***SGR.*** *No one outside the White House.*

***Bromley.*** That's your statement. We take it seriously because what we really are concerned about is having that specific goal out there driving a lot of very important reforms that for the first time in a long while are really changing the direction of our educational activities, particularly K through 12.

***SGR.*** *Do you share the view that money is not as serious a problem as many people have thought in the past?*

***Bromley.*** I do. There are many places where additional funding, in moderation here and there, can fine tune a situation. But, since we spend more per student than any country with the possible exception of Switzerland, it's clear that money isn't the problem. The group has identified as their top priority and as the major problem the question of teacher competence. I think everyone will agree on that one. And so the question, then, is what can we in the federal government do to improve teacher competence? And some rather ambitious plans are under way. Jim Watkins, for example, has taken the leadership in really using the remarkable resource that exists in the national labs in an education sense. [Leon] Lederman [former Director of the Fermilab] and his colleagues in Chicago have a pilot program to adopt the Chicago school system, which by most people's measure is one of the worst in the cities. And over a period of years, the intent there is to really get all the teachers of science and mathematics through this academy that has been set up and into Fermilab, into Argonne, to have some contact with the subjects they're teaching at the frontiers. The evidence so far is that it can have a dramatic effect.

***SGR.*** *Where is the evidence?*

***Bromley.*** The evidence is in the enthusiasm of the teachers, the performance of the kids. It's only been going for a year or so, so it's early to take any definitive measure. But the level of enthusiasm and the level of participation, the number of kids that say, "Hey, that's something that I could do," is increasing, and that's a point.

***SGR.*** *In many places, money is a problem. Does the coming budget try to deal with that?*

***Bromley.*** There will be substantial increases for a variety of educational programs. But, fundamentally, education remains a state and region responsibility in our system. And that will remain the case. The federal government, clearly, is not going to take over that. But we're going to try to have impacts where the system as it now exists at the state and regional level has left some gaps. One of the problems that was heavily discussed at the education summit was the fact that so many of our kids, particularly urban kids, when their chronological age brings them to school are neither mentally nor physically equipped to undertake education. That suggests that we want to strengthen programs like Head Start and those kinds. So, that's clearly in the area where the federal government can play an important role

Another area where the federal government can play a very important role—what we're trying to work on—is the fact that you want to establish national standards. I don't say a national curriculum, because many people interpret that to have an element of coercion. It will tell us what kids should know in science and mathematics at the end of grade 4, grade 8, grade 12. And one of the real challenges that we haven't finished at all yet is to develop mechanisms to allow measurements of performance against those standards. What this means, then, is that each kid, each school, teacher, state, and the federal government can get a report card that measures performance.

## *Job Changes & Appointments*

***Donald B. Henderson***, recently retired Dean of the Johns Hopkins School of Hygiene and Public Health, has been nominated by the President to be Associate Director for Life Sciences at the White House Office of Science and Technology Policy. He would succeed ***James B. Wyngaarden***, former Director of NIH, who left the White House post last year following election as Foreign Secretary of the National Academy of Sciences.

***Rep. George Brown*** (D-Calif.), has brought in his own crew to fill the top staff posts at the House Science, Space, and Technology Committee, to which he was elected Chairman for the 102d Congress. ***Radford Byerly Jr.***, a physicist who served with the Committee from 1975-87, has been appointed Executive Director, succeeding ***Robert C. Ketcham***, whom Brown dismissed. ***Michael C. Rodemeyer***, also formerly with the Committee, was named Committee Counsel. Two longtime staff associates of Brown were also appointed to Committee posts: ***William A. Styles Jr.***, as Legislative Director, and ***Pete Didisheim***, Assistant Staff Director.

***Richard F. Celeste***, former Governor of Ohio, has been appointed by the Carnegie Commission on Science, Technology, and Government to head a Task Force on Science and Technology and the States. ***Chris Coburn***, who served in the state government as Celeste's Science and Technology Adviser, has joined Battelle, in Columbus, as Director of Public Technology Programs.

## *White House Names Healy for NIH*

The uncertainty about Bernadine Healy's long-reported, but never verified, selection to head the National Institutes of Health was resolved January 10, when the White House announced its intention to nominate her for the post. Healy heads research at the Cleveland Clinic Foundation.

# AAAS Head Toots Tin Trumpet for Science Funding

Public meetings proclaiming fiscal crisis have become a ritual of science in its relations with the federal government. Since the information offered is usually stale and known to those who influence the money flow, no one expects much of these dour proceedings. But even these low expectations went unfulfilled last week when two institutional pillars of the science establishment teamed up for a crying session.

Many in the invited audience of several hundred, mainly federal research administrators and Congressional staff, were repelled by the whiny tone of the proceedings and its explicit premise of science's right to generous funding even in dire national budget circumstances.

The setting was the National Academy of Sciences, and the central figure in the proceedings was Leon M. Lederman, Nobel physicist, President of the American Association for the Advancement of Science, and retired Director of the Fermilab. Lederman is a cherubic relic of the bygone era in which physicists, riding on their wartime glory, governed science politics with a paternalistic arrogance arising from their conviction that genius has its prerogatives.

His current hobby is the salvation of math and science in the Chicago school system. But, as a sideline, he's campaigning for more money for science. Toward that goal, he had the AAAS staff solicit morale reports from researchers in 40 major universities. The findings are contained in a report released at the Academy meeting, *Science: The End of the Frontier?* (19 pp., no charge; order from: AAAS, Directorate for Science and Policy Programs, 1333 H St. NW, Washington, DC 20005; tel. 202/326-6600.)

The title is a word play on the 1945 report to the President, *Science: The Endless Frontier*, that established the framework for federal support of academic science. The nearly 250 responses that came in, Lederman states in his report, "confirmed my expectations of trouble, but with a depth of despair and discouragement that I have not experienced in my 40 years in science."

Though exuding confidence, Lederman chilled his audience by opening with one of the most hackneyed jokes on the Washington talk circuit—the one about the farmer beating his mule with a two-by-four, not to get him moving, "but to get his attention." As silence ensued, he went on to explain that he sought the attention of the policy people in the audience to alert them to the failing condition of American science.

The year 1968, he said, "was the peak year of what we call the Golden Age" in federal support of science. He was apparently unaware that in 1968, the New York Academy of Sciences held a meeting on "The Crisis Facing American Science," at which it released a "Preliminary Report on the Effects of Decreased Federal Support of Scientific Research and Education."

In any case, Lederman said that science could either accommodate itself to "priorities and restraint," or fight for additional funds on the ground that "it is one of the best investments the nation can make." He chose the latter, he said, adding that the $10 billion a year that Washington provides for basic research is a small part of the federal budget and the gross national product. The amount should be doubled within a few years, Lederman urged, and followed by annual increases of 8-10 percent.

To get more money, he continued, science "must expand direct contact with the general public" through press and TV. And, he said, consideration should be given to taxing "high-technology consumer goods" for the benefit of science. Audible groans arose from the audience.

Lederman was followed to the lectern by several scientists who told sad tales of their difficulty in obtaining research funds. In a question and comment period, a staff member from the National Science Foundation said, "We can't exponentiate forever," and noted that the growth rates of the 1950s and 1960s were "an anomaly" in science support. This heretic added that "not all proposals should be funded" and "no support is forever." In response, Lederman reverted to recollections of the "Golden Age."

Stepping to the podium, Academy President Frank Press courteously thanked Lederman for putting "a human dimension on these dry data." But Press, who understands Washington's grim budget realities, declared, "No nation can write a blank check for science." He urged the audience to recognize that, even with its fiscal shortcomings, "American science is the best supported in the world." And, while campaigning for more money, Press said, science must establish priorities. "Some things are more important than others," he said, adding that "We may have to make choices."

The eternal romantic, Lederman remained unconvinced by the calls for political realism. At the end of the meeting, he proclaimed, "A good criterion for healthy science is that every good scientist can fulfill his desires."

# In Print: Science Advice, PhD Programs, Europe '92

*The publications listed are obtainable as indicated—not from SGR.*

***Worldwide Science and Technology Advice to the Highest Levels of Government*** (Pergamon Press, 430 pp., $28.50 softcover, $59.50 hardcover), edited by William T. Golden, a Truman-era science adviser, an ambitious and surprisingly successful collection describing the workings of government science advice in 35 countries. Most of the authors are elder statesmen of science, a breed that usually feels neglected by politics—which may account for the candid discussions of how their governments manage science.

**Order from: Pergamon offices in the UK, Australia, Brazil, Canada, Germany, India, Japan, Korea. In the US: Pergamon Press, Front and Brown Sts., Riverside, NJ 08075; tel. 1-800-257-5755.**

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***Institutional Policies to Improve Doctoral Education*** (19 pp., $2), from the Association of American Universities, the upper crust of Washington higher-ed lobbies, a series of recommendations that invite alarm about what's going on in the PhD mills, e.g., "Course sections should never be offered when the principal justification is to provide financial support for graduate students" and "Students should be adequately advised about preparation for qualifying exams . . ."

**Order from: AAU, Suite 730, One DuPont Circle NW, Washington, DC 20036; tel. 202/466-5030.**

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***How the Economic Transformations in Europe Will Affect the United States*** (140 pp., no charge), by the Congressional Budget Office, a crystal-ball exercise focused on Western European economic integration and the upheavals in Eastern Europe. Nothing on science, and only a bit on aerospace, but the report provides useful background for worriers about the future of sci-tech relations between the doubt-ridden US and the rising Old World.

**Order from: Congressional Budget Office, Publications, 2d and D Sts. SW, Washington, DC 20515; tel. 202/226-2809.**

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***Interim Report of the [Wisconsin] Governor's Science and Technology Council*** (108 pp., no charge), another manifestation of the strivings in the states to harness science and technology to economic growth. The 19-member Council, drawn from industry and academe, was established last January, and has been looking at various sci-tech activities in the state, with a strong emphasis on biotechnology as a growth sector for Wisconsin. A final report is scheduled for October.

**Order from: Wisconsin Department of Development, 123 West Washington Ave., PO Box 7970, Madison, Wisconsin 53707; attn. Randy Wade; tel. 608/267-9214.**

***Consensus Development at the NIH: Improving the Program*** (81 pp., $15, plus $3 for shipping), from the Institute of Medicine (IOM), by a committee appointed at the request of NIH to examine the NIH consensus program, established in 1977 to evaluate biomedical technology and practices. The committee, chaired by J. Sanford Schwartz, University of Pennsylvania health-care economist, recommended, among other things, that the program "should be broadened to include relevant economic, social, and ethical aspects of assessing medical technologies"; also that NIH should "acknowledge explicitly that the ultimate goal of the program is to change behavior toward appropriate use of health practices and technologies."

Also from the IOM: ***Improving Consensus Development for Health Technology Assessment: An International Perspective*** (163 pp., $15, plus $3 shipping), by authors from 11 countries, general discussions of consensus techniques, with specific reports on Canada, Denmark, Finland, The Netherlands, Norway, Sweden, UK, and US.

**Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 1-800-624-6242; in Washington, DC: 334-3313.**

Note: a *Statement Order Form*, listing titles of the 83 NIH Consensus Statements issued between 1978 and 1990, is available without charge from: NIH, Office of Medical Applications Research, Bldg. 1, Room 260, Bethesda, Md. 20892; tel. 301/496-1143.

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***Physics News in 1990*** (75 pp., $5 for one copy, $3 apiece for more), by the American Institute of Physics, an annual compilation of important developments in major fields of physics, from acoustics to vacuum physics. Included are brief reports on federal agencies that support physics research.

**Order from: American Institute of Physics, c/o AIDC, 64 Depot Rd., Colchester, Vt. 05466; tel. 1-800-445-6638; in Vermont: 802/878-0315.**

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***Federal Funding of Academic Chemistry Research, FY 1980-FY 1988*** (33 pp., no charge), from the American Chemical Society, reports trends in government-wide support over the span of years (from $160 million to $300 million in current dollars), comparisons with other disciplines, top-dollar universities in the field. Conclusion: Chemistry experienced "lower than average growth" among the disciplines, and was especially hardhit between 1985 and 1988, when growth, adjusted for inflation, dropped to 0.1 percent compared to 4.3 percent growth for other fields.

**Order from: ACS, Science Policy Analysis, 1155 16th St. NW, Washington, DC 20036; Attn. Annette Rosenblum; tel. 202/872-4383.**